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PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING

PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

To:
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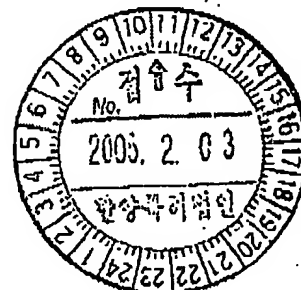
Date of mailing (day/month/year)	31 JANUARY 2005 (31.01.2005)
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Applicant's or agent's file reference FP03046PC		IMPORTANT NOTIFICATION	
International application No. PCT/KR2003/002063	International filing date (day/month/year) 07 OCTOBER 2003 (07.10.2003)	Priority date (day/months/year) 07 OCTOBER 2002 (07.10.2002)	
Applicant HAN, Man-Yop			

- The applicant is hereby notified that International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
- A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
- Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
- REMINDER**
The applicant must enter the national phase before each elected office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details in the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference FP03046PC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/KR2003/002063	International filing date (day/month/year) 07 OCTOBER 2003 (07.10.2003)	Priority date (day/month/year) 07 OCTOBER 2002 (07.10.2002)
International Patent Classification (IPC) or national classification and IPC IPC7 E02D 17/04		
Applicant HAN, Man-Yop		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 7 sheets.

3. This report contains indications relating to the following items:
- I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 06 MAY 2004 (06.05.2004)	Date of completion of this report 27 JANUARY 2005 (27.01.2005)
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/KR2003/002063

1. Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed☒ the description:pages 1 - 23

, as originally filed

pages _____

, filed with the demand

pages _____

, filed with the letter of _____

☒ the claims:

pages _____

, as originally filed

pages _____

, as amended (together with any statement) under Article 19

pages _____

, filed with the demand

pages 24 - 30, filed with the letter of 08/12/2004☒ the drawings:pages 1 - 38

, as originally filed

pages _____

, filed with the demand

pages _____

, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____

, as originally filed

pages _____

, filed with the demand

pages _____

, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☒ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4. ☒ The amendments have resulted in the cancellation of:☒ the description, pages NONE☒ the claims, Nos. 7☒ the drawings, sheets NONE

5.

☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed," and are not annexed to this report since they do not contain amendments (Rules 70.16

INTERNATIONAL PRELIMINARY EXAMINATION

International application No.

PCT/KR2003/002063

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	1-6, 8-26	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	1-6, 8-26	YES
	Claims	NONE	NO
Industrial applicability (IA)	Claims	1-6, 8-26	YES
	Claims	NONE	NO

2. Citations and explanations (Rule 70.7)**1. Subject-Matter**

This statement is based on the amended claims 1-6 and 8-26 filed with the letter of December 8, 2004. The subject-matter of the present application relates to a prestressed support system for prestressing supporting members by using tendons in vertical piles such as H-beams and horizontal piles such as wales when an underground structure is built.

2. Prior Art

D1: KR 10-188465 B1 (12 January 1999).

D2: JP 2000-297590 A (24 October 2000)

D1 relates to a sheathing method by prestressing, comprising the steps of: inserting an excavation pile in a longitudinal direction; installing a wale in a horizontal direction on a front surface of the pile and supporting the connection corner by a strut; attaching a double wale onto the surface of the wale by a bolt; installing a bracket at both ends of the double wale and fixing the bracket thereto by an anchor block; and inserting a cable into the hole of the bracket and coupling a nut with a sleeve which is pressed by said cable, thereby maintaining the tension of the cable, generating a prestress moment on the double wale, and resisting the earth pressure.

D2 relates to an excavation wall construction method requiring no earth retaining timbering for performing construction or reconstruction in a narrow space and for decreasing the construction time and construction cost.

3. Novelty

Neither of the available prior art documents D1 and D2 discloses or suggests the subject-matter of the present application. Therefore, novelty can be acknowledged for the subject-matter of claims 1-6 and 8-26 of the present application.

4. Inventive Step

According to the detailed description and the claims amended by the amended sheet of 2004.12.08, the present application has several advantages. Therefore, an inventive step can be acknowledged for the subject-matter of claims 1-6 and 8-26 of the present application.

5. Industrial Applicability

Industrial applicability can be acknowledged for the subject-matter of claims 1-6 and 8-26 of the present application.

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WHAT IS CLAIMED IS:

1. (Amended) A pre-stressed support system for supporting the excavated ground load by using supporting members, a tendon support member being arranged about the central region of said supporting members along a longitudinal direction of said support members, a plurality of tendon support members each height being gradually decreased from the center of said supporting members toward both directions thereof and each being disposed at a predetermined interval, and tensioning members being fixedly supported on said plurality of tendon support members to thereby form an overall semi-parabola shape.
2. The system as defined in claim 1, wherein said supporting members are horizontal beams such as wale for supporting the excavated ground.
3. The system as defined in claim 1, wherein said supporting members are vertical piles for supporting the excavated ground.
4. The system as defined in claim 1, wherein said supporting members are main girder for withstanding load.
5. The system as defined in claim 1, wherein said supporting members are H-piles, steel piles having circular or square sections, or concrete piles having circular or square sections.
6. The system as defined in claim 1, wherein said tensioning members are selected

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from a group consisting of tendons, carbon fibers, glass fibers, aramid fibers, and etc.

7. (Deleted)

5 8. (Amended) The system as defined in claim 3, wherein said tendon support members and said tensioning members are attached to said supporting members so that said supporting members are pre-stressed at the upper and lower parts thereof in the longitudinal direction, and struts for supporting said supporting members are further provided.

10 9. (Amended) The system as defined in claim 3, wherein said tendon support members and said tensioning members are attached to said supporting members so that said supporting members are pre-stressed at the lower part thereof in the longitudinal direction, and said supporting members are disposed at both sides of the excavated underground space in the lateral direction and the longitudinal direction in large numbers, and said tendon support members and said tensioning members are attached to main girders so that they are pre-stressed and, said main girders are attached to the upper ends of said supporting members disposed at both sides of the excavated underground space so that cover plates are placed on said main girders, a main structure is built in the space between said supporting members disposed at both sides of the excavated underground space at the lower parts of
15 said supporting members, and struts are placed on the main structure such that said struts are
20 fixed to said supporting members disposed at both sides of the excavated underground space.

10. The system as defined in claim 1, wherein said supporting members are wales

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disposed at both sides of the excavated underground space in the longitudinal direction, said tendon support members comprise two of first tendon supports disposed at the middle part of each of said wales in the longitudinal direction and second tendon supports attached to said wales at both sides of said first tendon supports such that the height of said second tendon supports are lower than that of said first tendon supports, said tensioning members are placed on said tendon support members so that said wales are pre-stressed, said struts are disposed at regular intervals in the longitudinal direction of said wales in pairs such that said struts are attached to said wales, the pairs of said struts being braced.

10 11. (Amended) The system as defined in claim 10, wherein a plurality of vertical piles extended in the vertical direction of the excavated underground space are disposed at said wales at regular intervals, said tendon support members and said tensioning members are respectively attached to said vertical piles so as to be pre-stressed at a region directly subjected to the earth pressure in the longitudinal direction.

15

12. (Amended) The system as defined in claim 1, wherein said supporting members comprise a plurality of first vertical piles arranged at regular intervals in the longitudinal direction and extended in the vertical direction of the excavated underground space, and second vertical piles disposed at both sides of the excavated underground space and extended in the vertical direction of the excavated underground space;

20

said tendon support members and said tensioning members are disposed at the lower parts of said first and second vertical piles so that the lower parts of said first and second vertical piles are pre-stressed;

a plurality of wales are disposed at the upper and lower parts of said first vertical

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piles so that said first vertical piles are attached to said wales;

said tendon support members and said tensioning members are disposed at said wales so that said wales are pre-stressed;

the upper ends of said second vertical piles disposed at both sides of the excavated underground space are connected to each other by means of main girders;

cover plates are placed on said main girders;

-- said tendon support members and said tensioning members are disposed at said wales so that said wales are pre-stressed;

said second vertical piles disposed at both sides of the excavated underground space are connected to each other by means of a plurality of struts; and

the main structure is built in the space between said first and second vertical piles.

13. (Amended) The system as defined in claim 1, comprising the steps of:

disposing vertical piles at both sides of the excavated underground space in the longitudinal direction after the ground is excavated to a prescribed depth;

pre-stressing main girders by means of tendon support members and tensioning members;

disposing the main girders at the upper ends of said vertical piles disposed at both sides of the excavated underground space such that said main girders are connected to said vertical piles;

pre-stressing wales by means of tendon support members and tensioning members;

disposing said wales at said vertical piles such that said wales are connected to said vertical piles arranged in the longitudinal direction;

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fixing struts to the lower parts of said vertical piles; and
pre-stressing the lower parts of said vertical piles by means of tendon support
members and tensioning members.

5 14. The system as defined in claim 1, wherein said tendon support members are
trusses fixed to said supporting members in the longitudinal direction so that said tensioning
members are laid on the trusses while said tensioning members are supported by means of
said trusses.

10 15. The system as defined in claim 14, wherein each of the trusses has a long side, a
short side, and first and second oblique sides connecting the long and short sides, the long
and short sides and the first and second oblique sides together forming a trapezoidal shape,
so that one end of said tensioning member is fixed to one surface of the long side of said
truss, passes through the first oblique side and the short side of said truss, and is fixed to the
15 other surface of the long side of said truss via the second oblique side of said truss.

16. The system as defined in claim 14, wherein each of said trusses has a long side, a
short side, and first and second oblique sides connecting the long and short sides, the long
and short sides and the first and second oblique sides together forming a trapezoidal shape,
so that one end of said tensioning member is fixed to one surface of the long side of said
20 truss, is extended to the middle part of the short side of said truss and fixed to the short side,
and is fixed to the other surface of the long side of said truss.

17. The system as defined in claim 14, wherein each of said trusses has a long side, a

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short side, and first and second oblique sides connecting the long and short sides, the long and short sides and the first and second oblique sides together forming a trapezoidal shape, so that one end of said tensioning member is fixed to one surface of the short side of said truss, is extended in the longitudinal direction of the short side of said truss, and is fixed to
5 the other surface of the short side of said truss.

18. -- (Amended) The system as defined in claim 1, wherein both ends of said respective tensioning members are fixed by means of anchoring units attached to said supporting members.

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19. (Amended) The system as defined in claim 1, wherein each of said tendon supports has a tendon base formed at the upper end thereof, said tendon base having a curved tendon guide.

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20. (Amended) The system as defined in claim 1, wherein each of said tendon supports has a thread part and a height-adjusting knob so that the height of said tendon support can be adjusted by means of said thread part and said height-adjusting knob.

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21. The system as defined in claim 19, wherein said tendon base is extended in the lateral direction so that said tendon base does not make contact with said support beams, said second and the third tendon supports being fixed to said supporting members by means of "L"-shaped bolts.

22. The system as defined in claim 19, wherein said tendon base is disposed at both

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sides of said supporting members so that said tendon base does not make contact with said support beams, said second and the third tendon supports being fixed to said supporting members by means of "L"-shaped bolts.

- 5 23. The system as defined in claim 18, wherein said anchoring units are attached to the upper surfaces of said supporting members, and wherein each of said anchoring units comprises gusset plates disposed between flanges of said supporting members, a tendon support plate attached to one side of said flanges, and an anchoring steel plate and a supporting steel plate connected to said tensioning member.

10

24. The system as defined in claim 18, wherein said anchoring units are attached to the side surfaces of said supporting members, and wherein each of said anchoring units comprises gusset plates disposed between flanges of said supporting members, and a tendon support plate attached to said reinforcing steel plate, said tensioning member being fixed to
- 15 said tendon support plate.

25. (Amended) The system as defined in claim 1, wherein said supporting members are supported by means of jack supports mounted to a floor slab, said floor slab being a part of the main structure.

20

26. (Amended) The system as defined in claim 1, wherein "[]"-shaped channels are inserted between said flanges of said supporting members for reinforcing said supporting members.